Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	)	IB Docket No. 97-95 RM-8811

COMMENTS OF INTELSAT GLOBAL SERVICE CORPORATION

Introduction and Summary

Intelsat Global Service Corporation ("Intelsat") submits the following comments in response to the Commission's Further Notice of Proposed Rule Making ("FNPRM") in the above-captioned proceeding.[1] In this document, Intelsat has provided general comments or alternate proposals on the various sections of the FNPRM that could impact GSO/FSS operations. The comments pertain not only to the above FNPRM, but also, in places, relate to the original Report and Order in this proceeding that was adopted December 17, 1998.[2]

The comments are grouped into four sections dealing with the FCC proposed:

A. Designation Changes;

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[1] *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 36.0-43.5 GHz Band*, 66 Fed. Reg. 35399 (July 5, 2001) (Further Notice of Proposed Rule Making).

[2] *Allocation and Designation of Spectrum for Fixed Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0 GHz-38.0 GHz and 40.0-40.5 GHz for Government Operations*, 13 FCC Rcd 24659 (1998) (Report and Order).

B. Allocation Changes;

C. Power Flux Density (PFD) Limits; and

D. Ban on Certain Satellite Stations in the band 37.5-40.0 GHz.

Discussion

A. Proposed Designation Changes

1. Re-designate Portions of Satellite and Wireless Services Spectrum (FNPRM at ¶15)

Intelsat supports the Commission's proposed designation changes, *i.e.*, to re-designate the spectrum available for satellite uses from 37.6-38.6 GHz to 41.0-42.0 GHz and to re-designate spectrum available for terrestrial wireless services from 41.0-42.0 GHz to 37.6-38.6 GHz. This re-designation would benefit all FSS satellite operators, since the relocation creates a single 2 GHz contiguous spectrum block, which will greatly simplify spacecraft design. However, Intelsat is concerned that the Commission's proposals that accompany this re-designation concerning power flux density (PFD) limits and the increase in the number of services, may partially negate the benefit of this shift. Intelsat addresses these concerns below.

2. Add MSS Designation to the 40.5-41.0 GHz Band (FNPRM at ¶16)

This proposal would have an adverse effect on spectrum availability for FSS. The current FSS designations allow for 1 GHz of exclusive spectrum and 1 GHz of shared spectrum with either the BSS or the MSS. With the designations being considered, no spectrum would remain to which the FSS would have an exclusive designation. The BSS would share the designation in the 40.5-42.0 GHz band and the MSS would share the designation from the 40.0-41.0 GHz band. Intelsat is concerned that this proposal would result in the over-crowding of multiple services and applications in the band 40.0-42.0 GHz, apparently for the purpose of providing the wireless service with an unencumbered designation.

The problem in this case is further compounded by the fact that polarization isolation can not be relied upon to reuse frequencies in this band due to propagation factors. Due to the high rain attenuation in this band, additional bandwidth is required for fade compensation techniques

such as frequency or space diversity, more robust error correction coding and adaptive coding. Thus, wider bandwidths than at lower frequencies are needed for equivalent capacity. As a consequence, FSS satellite operators would not be able to achieve commercially acceptable availability levels by rain mitigation techniques that require larger bandwidths and rely on the use of dual-polarization in this band.

Furthermore, since the international allocation of the band 40.5-41.0 GHz for MSS is on a secondary basis, to make it co-primary with FSS in the United States will create an inequitable situation wherein the FSS services would have to operate subject to additional constraints only in the United States. For these reasons, Intelsat opposes the designation of MSS in this band.

3. Modify Part 25 and Part 101 Rules to Reflect New Designations (FNPRM at ¶17)

Intelsat believes that the proposed amendments to "Part 25 -- Satellite Communications", and in particular, "Section 25.202 -- Frequencies, Frequency Tolerance and Emission Limitations", and "Section 25.208 -- Power Flux Density Limits" of the FCC's Rules, are premature given that ITU-R studies are ongoing on PFD limits and the final agreement is expected at WRC-2003. Intelsat therefore urges the Commission to defer modifying the above two sections of Part 25 to a later date, when the Commission addresses service and licensing rules for these bands. Given that systems in the satellite and terrestrial services currently are in the early design stages, such amendments may be deferred without causing undue hardship. Studies at the ITU-R would by then be more complete and the Commission would have that information available for its consideration.

B. Proposed Allocation Changes

1. Add FSS Allocation in the 37.5-37.6 GHz Band (FNPRM at ¶19)

Intelsat supports this proposal because the additional 100 MHz of spectrum would provide additional capacity for the FSS and for the application of mitigation techniques to compensate for rain and other fades. This allocation change would also result in the U.S. Table of Frequency

Allocations being consistent with Article S5 of the ITU Radio Regulations.

2. Shift MSS Allocation from 39.5-40.0 GHz to 40.5-41.0 GHz (FNPRM at ¶¶22-25)

In general, Intelsat does not support the addition of another "primary" service to the band 40.5-41.0 GHz. To date, the lack of technological developments in MSS have prevented the non-Government use of any higher frequency allocations for this purpose. Moreover, there is no indication that even lower frequency MSS allocations are fully exploited. Therefore, there is no compelling need to provide the MSS with more than a secondary allocation in this band.

While the Commission states that the proposed band plans in this FNPRM reflect decisions reached at WRC-2000, Intelsat would like to point out that, in Region 2, the international Table of Frequency Allocations provides MSS only a "secondary" allocation, while the Commission is proposing to adopt a "primary" MSS allocation. Intelsat could, however, support a secondary domestic allocation to MSS in this band. In certain limited cases, recent experience has indicated that it may be cost-effective for terminals to be deployed on both moving and earth bound stations, *e.g.*, Earth Stations on Vessels (ESV) and Aeronautical Mobile Satellite Services (AMSS). A secondary domestic allocation without a designation would allow for the deployment of such services. Using FSS transponders for such services would safeguard against unduly impacting the deployment of the FSS in the band.[3]

Alternatively, Intelsat could support MSS in the 40.5-41.0 GHz band, if the 42.0-42.5 GHz band could be retained for FSS. As the Commission is aware, ITU-R studies in progress seem to indicate the possibility of successful co-existence of Radio Astronomy Service ("RAS") in the 42.5-43.5 GHz band with FSS in the 41.5-42.5 GHz band.

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[3] *See* "Working document concerning Agenda Item 1.11 (AMSS at 14 GHz of WRC-03", ITU-R/4A/217 (Rev. 1), June 22, 2001, § 4.11; "Earth Stations On-Board Vessels (ESV)", ITU-R/4-9S/48, December 5, 2000, §6.

3. Add FSS Allocation to 40.5-41.0 GHz (FNPRM at ¶26)

Intelsat is concerned with this allocation, as it may result in FSS non-Government users competing for spectrum with Government applications. This proposal attempts to combine into 2 GHz of bandwidth multiple services that currently have access individually to a much larger amount of spectrum for each service.

Intelsat understands that this additional allocation for Government MSS use has become necessary in light of the very severe pfd limits under consideration for the band 37.5-40 GHz. Many ITU studies have indicated that these PFD limits[4] may be over-protective of FS systems and thus would ultimately fail to be adopted by WRC 2003. Intelsat is of the view that, should this occur, the proposed additional allocation would be unnecessary.

4. Add FSS Allocation to the 41.0-42.0 GHz Band (FNPRM at ¶27)

Intelsat fully supports the Commission's proposal to add a "primary" domestic FSS allocation to the 41.0-42.0 GHz band, in accordance with WRC-2000 Final Acts -- Article S-21. Furthermore, Intelsat supports the relocation of the FSS allocation from 37.6-38.6 GHz to 41.0-42.0 GHz, resulting in the creation of 2 GHz of contiguous spectrum, thus allowing a simplified deployment of FSS systems and using the WRC-2000-adopted PFD limits for satellite operations in this band.

5. Consider Adding Fixed and Mobile Allocations for Non-Government Use to the 42.5-43.5 GHz Band (FNPRM at ¶31)

As the Commission proposes to allocate 37.5-40.0 GHz band to the FSS, there is a need for corresponding spectrum in the Earth-to-space direction. Since the band from 48.2-50.2 GHz (E-to-s) is assumed to be paired with the band 40-42 GHz (s-to-E), it leaves only the bands 42.5-43.5 GHz (E-to-s) and 47.2-48.2 GHz (E-to-s) that can be paired with the band 37.5-40.0 GHz

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[4] *See* Table S21-4 as invoked by Article S21.16.

(s-to-E). Because the band 42.5-43.5 GHz is very close to the band 37.5-40.0 GHz (s-to-E), it would be difficult to pair parts of the two bands due to the impact of intermodulation products on the spacecraft. The band 47.2-48.2 GHz, however, is sufficiently removed from the band 37.5-40 GHz and, as such, would be suited for uplink connections to this band. Intelsat agrees with the Commission's proposal to revert to the current allocations in this band as suggested in ¶ 31 of the FNPRM.

6. Protect Radio Astronomy in the 42.5-43.5 GHz Band (FNPRM at ¶32)

As the Commission is aware, WRC-2000 modified Resolution 128 and added a Footnote S5.551G to the Radio Regulations.[5] Under Footnote S.5.551G, the aggregate PFD in the 42.5-43.5 GHz band produced by all space stations in any NGSO system operating in the 41.5-42.5 GHz band shall not exceed -167 dBW/m^2/MHz at the site of an RAS station for more than 2% of the time. This footnote also restricts GSO FSS or BSS operations in the 42.0-42.5 GHz band. The PFD limits of this footnote are provisional and subject to review by WRC-2003.

The band 41.5-42.5 GHz is covered by WRC-2003 Agenda Items 1.8.2[6] and 1.32A & B[7]. Work is ongoing within the ITU-R on the sharing conditions required between the space service in the band 41.5-42.5 GHz and the RAS in the band 42.5-43.5 GHz. Given the very high levels of attenuation resulting from atmospheric effects, much of the satellite RF energy must be focused into a relatively small area in order to achieve viable communications. As a result, the

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[5] WRC-2000 Final Acts, n. S5.551G.

[6] WRC-2003 Agenda Item 1.8.2, "Consideration of the results of studies and proposal of any regulatory measures regarding the protection of passive services from unwanted emissions, in particular from space service transmissions, in response to recommends 5 and 6 of Recommendation 66" (Rev. WRC-2000).

[7] WRC-2003 Agenda Item 1.32A & B, "Consideration of technical and regulatory provisions concerning the 37.5-43.5 GHz , in accordance with Resolution 128 (Rev. WRC-2000) and Resolution 84" (WRC-2000).

power flux density could potentially be met over all but a very small portion of the earth. As relatively few RAS stations make use of this frequency band and are likely to be far removed from urban centers, spacecraft designers can use geographical separation to ensure that the unwanted emission limits are met, even for stations operating in the band 42-42.5 GHz.

If co-existence with the RAS is found to be possible, Intelsat would propose that the 500 MHz designation to FSS be retained. This would allow for the capacity required by a proposed usage of the 40.5-41.0 GHz band by Government for FSS and MSS services. As the spectrum is significantly removed from other FS bands, it is likely to be poorly suited for wireless applications requiring high bandwidths and high levels of protection. Intelsat therefore proposes that the Commission defer a decision on the domestic allocation or designation of the band 42.0-42.5 GHz until the completion of the work by the ITU-R.

C. Proposed PFD Limits

1. Default Rule for PFD Limits (FNPRM at ¶¶36-38)

As a result of WRC-2000 decisions, as reflected in Article S21 of the Final Acts, PFD limits were established for normal operating conditions, but licensees were obliged to decrease power during clear sky operation in Region 2 by 12 dB unless agreement was obtained from the impacted Administration. The current limits in Table S21-4 invoked by Article S21.16 were modified to allow for the deployment of either HDFS or HDFSS as decided on an Administration by Administration basis. Region 2 Administrations were allowed by WRC-2000 to provisionally depart from these limits in order to protect FS systems being deployed in the band 37.5 to 40 GHz. Technical studies, once completed, may well show that the provisional 12-dB restriction in Resolution 84 may not be necessary for the protection of certain wireless operations in this band. Furthermore, the United States may decide at a future time that the services requiring additional protection may not be viable and resort to leaving the regulations with the limits given in S21-4 as the default values. As a result, Intelsat recommends that the

domestic regulations be consistent with the international rules and provide for the possibility that the more constraining limits may be changed by WRC-2003. Therefore, Intelsat proposes that the baseline or the default rule for PFD limits should remain the current S21-4 PFD limits as approved by WRC-2000.

2. FSS PFD Limits (FNPRM at ¶¶39-40)

Intelsat favors delaying the decision regarding PFD limits. Intelsat believes that a decision at this time, prior to the completion of the work by the ITU-R, is beneficial to neither the FS nor the FSS concerns in this band. As FSS systems in the band are at the preliminary design stage and the technology and business plans are not yet mature, delaying this decision will have minimal impact.

Discussions within the ITU-R to date have focused on verifying whether the candidate limits provide the required level of protection to sensitive FS systems without unduly constraining the FSS. A serious concern has been raised in the ITU-R that the 12 dB additional restriction required in Resolution 84 over-protects the FS, which is currently being thoroughly examined in ITU-R. If the Commission were to base its order on the conservative PFD limits in Resolution 84, more relaxed limits may be adopted internationally by WRC-2003. If this were to happen, retaining the Resolution 84 limits would unduly jeopardize the prospects of viable U.S. FSS systems in these bands. As a result, Intelsat suggests that the public interest would best be served by delaying a decision on this issue until after the ITU-R studies have been completed.

3. Additional GSO FSS Constraints (FNPRM at ¶42)

The proposed PFD limits were derived based on a methodology that has been argued internationally to be inappropriate for this band. WP 4-9S is presently completing studies to develop methodologies that more appropriately assess the impact on the FS by the FSS. Preliminary results based on these methodologies would suggest that the limits in S21-4 might by themselves be adequate in protecting the sensitive FS cases presented.

Furthermore, Intelsat is concerned with PFD limits stricter than S21-4 being applied to U.S.-licensed spacecraft that do not have U.S. territory as part of their service area. If such satellites were obliged to abide by the same PFD restrictions, due to design constraints, when serving territories outside of the United States, they would be at a disadvantage with regards to spacecraft licensed by countries having more permissive domestic regulations. Intelsat proposes that any PFD limits that the FCC adopts be restricted to those beams covering the continental United States only.

4. Time Limits on PFD Exceptions (FNPRM at ¶43)

GSO/FSS operators should be limited to using no more power than is required to overcome atmospheric effects. Specific values are time and location dependent due to variations in geography and climate. As a result, it may be difficult to quantify a specific value that represents all cases. Intelsat proposes that any domestic regulation at this preliminary stage be limited to a general statement that GSO/FSS operators shall limit the power increase to the minimum necessary to overcome atmospheric effects.

D. Satellite Earth Stations

1. Proposed Ban on Certain Satellite Earth Stations in the Band 37.5-40.0 GHz (FNPRM at ¶¶45-47)

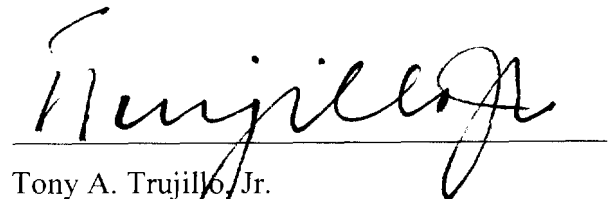
Intelsat believes that this proposal is predicated on the fact that at the present time only large gateway earth stations would be able to operate in this band given the severe PFD limitations. However, as pointed out in ¶ 45 of the FNPRM, future technological developments and market demand may permit the deployment of other earth stations. In order to allow efficient usage of spectrum resources without undermining the co-designation of the band to wireless systems, Intelsat suggests that only gateway-type earth stations receive protection as described in the proposed changes to Part 101 of the FCC Regulations, while other user earth stations be permitted on a non-protected basis.

Conclusion

The FCC is to be commended for undertaking this effort to realign the use of the V-Band spectrum to reflect potential usage by satellite and terrestrial services. Intelsat sees considerable merit in most of the Commission's proposals concerning spectrum allocation changes. However, on the issues of adding new services to the bands holding the greatest promise for ubiquitous FSS services and the proposed PFD limits, Intelsat requests that the Commission consider that studies in the ITU are still in progress, the results of which may influence the Commission's rules. Intelsat urges the Commission to defer any decision on PFD limits to a later proceeding that would also address service rules and license issues, by which time the results of ITU-R deliberations would be known. Intelsat believes that because the development of both fixed services and satellite services in this band is in early stages, it would be prudent to defer such far-reaching decisions. If, however, the Commission feels that a decision must be made prior to completion of ongoing ITU-R studies, Intelsat urges the Commission to first arrange for an expeditious resolution of the pending technical sharing issues between the concerned domestic FS and FSS operators in this band.

Respectfully submitted,

INTELSAT GLOBAL SERVICE CORPORATION



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